ABSTRACT

A time-varying multi-path generating apparatus that generates time-varying characteristics of propagation path parameters, a multi-path fading simulator, and a multi-path generating method are disclosed. The generating apparatus for simulating multi-path fluctuations in radio communications consists of a parameter control unit for controlling generation conditions of propagation paths, a data storage unit for storing propagation path generation parameters and data files, and a propagation path generating unit for generating time-varying propagation paths. Multiple time-varying amplitude functions and multiple time-varying phase functions are generated based on the data files, the propagation path generation parameters, and random numbers generated by a random number generating unit. The time-varying amplitude functions are aligned serially in the time domain such that a time-varying shadow amplitude function is obtained, which is repeated N times where N represents the number of propagation paths. The time-varying phase functions are aligned serially such that a time-varying shadow phase function is obtained, which is repeated N times, resulting in N time-varying shadow phase functions. An initial amplitude, an initial phase, an initial time delay, and an initial arrival direction are generated as the propagation path parameters of a propagation path using random numbers based on the initial value generation parameters. The time-varying shadow amplitude functions and the time-varying shadow phase functions are superimposed on the initial amplitude and the initial phase, respectively, for generating time-varying propagation paths.